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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/774,888	02/01/2001	Jun Koyama	740756-2255	3194

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EXAMINER	
WEISS, HOWARD	

ART UNIT	PAPER NUMBER
2814	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/774,888	KOYAMA ET AL.	
	Examiner	Art Unit	
	Howard Weiss	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,77-84,87-90,93-103,105,106 and 108-153* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,77-84,87-90,93-103,105,106 and 108-153* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *0107*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Attorney's Docket Number: 740756-2255

Filing Date: 2/1/01

Continuing Data: RCE established 3/27/2003, 8/19/2004, 10/13/2005 and 11/22/2006

Claimed Foreign Priority Date: 2/1/00 (JPX)

Applicant(s): Koyama et al. (Kato)

Examiner: Howard Weiss

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1, 77 to 84, 87 to 90, 93 to 103, 105, 106 and 108 to 153 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claims, as amended, detail that the control gate comprises a laminate film whose component films comprise an inert element (i.e. xenon). However, there is nothing in the Specification, including the figures, which would led one of ordinary skill in the art to conclude that any inert element becomes part of the laminate film. The section of the Specification cited by the Applicants for support for this limitation (Page 27 Lines 10 to 20) states that an inert element gas (i.e. xenon etc.) can be used as a sputtering gas but does not state anywhere that this gas should be part of the laminate film. One of ordinary skill in the art would know that an inert element gas is used in sputtering to prevent any of the gas to interact with and contaminate the film being sputtered. This would exclude any inert element being part of said film. The Examiner considers this limitation (i.e. laminate film comprising an inert element such as xenon) to be new matter which falls under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 77, 79 to 81, 83, 84, 87,89, 90, 93, 95 to 98, 100 to 103, 106, 108 to 111, 113 to 116 and 122 to 149 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. (JP 11-154714 and the Derwent Translation of this document), Ho et al. (U.S. Patent No. 4,680,854) and Tsutsumi (U.S. Patent No. 5,844,274).

Yamazaki et al. show most aspects of the instant invention (e.g. Figures 1 to 8) including:

- a memory cell array with memory cells formed in a n x m matrix with X-address **101** and Y-address **102** decoders electrically connected to signal lines **Cnn,Dnn, Amm,Bmm**
- each cell containing a memory thin film transistor (MTFT) **Tr1** and a switching thin film transistor (STFT) **Tr2**
- said MTFT including:

- a first semiconductor active layer **202** formed on an insulating substrate **201**, having a first thickness **d1** and comprising a channel forming region **205**
- a first insulating film **211**, a conductive layer (i.e. floating gate electrode) **213** adjacent to the first semiconductive active layer and used to trap electrons, a second insulating film **214** of an oxide and a control gate electrode **215**
- a wiring **825** for connecting the control gate to a first single line **809**

➢ said STFT including:

- a second semiconductor active layer **206** formed on an insulating substrate **201** and having a second thickness **d2**
- a gate insulating layer **212** and a gate electrode **217**
- a second signal line **810** connected to said gate electrode

➢ where in **d1** is thinner (i.e. smaller) than **d2** (Paragraphs 0058 and 0059)

Yamazaki et al. does not show the floating gate comprising silicon with one conductivity, the control gate comprising a laminate of three films: TaN/W/WN and each film comprising the inert element xenon.

Tsutsumi teaches (e.g. Column 17 Lines 14 to 20) it is common, and therefore obvious, to form gate electrodes of layers comprising TaN/W/WN. It would have been obvious to a person of ordinary skill in the art at the time of invention to form gate electrodes of layers comprising TaN/W/WN as taught by Tsutsumi in the device of Yamazaki et al. since it is common in the art to do so. Also, it is common to use silicon with one conductivity (e.g. doped polysilicon) as floating gate material.

Ho et al. teach (e.g. Column 2 Lines 47 to 59) to put xenon into metal conductive films to prevent hillock and electromigration (Column 1 Lines 38 to 45). It would have been obvious to a person of ordinary skill in the art at the time of invention to put

xenon into metal conductive films as taught by Ho et al. in the device of Yamazaki et al. to prevent hillock and electromigration.

5. Claims 117, 118, 120, 121 and 150 to 153 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al., Ho et al. and Tsutsumi, as applied to Claim 1 above, and further in view Akbar (U.S. Patent No. 5,656,845).

   Yamazaki et al., Ho et al. and Tsutsumi show most aspects of the instant invention (Paragraph 4) except for the first and second semiconductor layer in a common semiconductor island. Akbar teaches (e.g. Figures 1 and 8 to 10) to form first and second semiconductor layers in a common semiconductor island (i.e. layer) **122** to provide memory cells with improved performance and reliability (Column 2 Lines 19 to 22). It would have been obvious to a person of ordinary skill in the art at the time of invention to form first and second semiconductor layers in a common semiconductor island as taught by Akbar in the device of Yamazaki et al., Ho et al. and Tsutsumi to provide memory cells with improved performance and reliability.

6. Claims 78, 82, 88, 94, 99, 105 and 112 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al., Ho et al. and Tsutsumi, as applied to Claim 1 above, and further in view of Koyama (U.S. Patent No. 5,793,344).

   Yamazaki et al., Ho et al. and Tsutsumi show most aspects of the instant invention (Paragraph 4) except for the semiconductor device comprising a pixel portion over the substrate, a source wiring driver circuit for driving the pixel portion over the substrate and a gate wiring driver circuit for driving the pixel portion over the substrate for controlling the non-volatile memory circuit all part of an LCD of a video camera. Koyama teach (Paragraph 3) to use the memory device with the listed devices to produce a high quality display device (Column 7 Lines 55 to 61). It would have been obvious to a person of ordinary skill in the art at the time of invention to

use the memory device of Yamazaki et al., Ho et al. and Tsutsumi with the listed devices of Koyama to produce a high quality display device.

7. Claim 119 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al., Ho et al., Tsutsumi and Koyama, as applied to Claim 78 above, and further in view of Akbar.

Yamazaki et al., Ho et al., Tsutsumi and Koyama show most aspects of the instant invention (Paragraph 6) except for the first and second semiconductor layer in a common semiconductor island. Akbar teaches (e.g. Figures 1 and 8 to 10) to form first and second semiconductor layers in a common semiconductor island (i.e. layer) **122** to provide memory cells with improved performance and reliability (Column 2 Lines 19 to 22). It would have been obvious to a person of ordinary skill in the art at the time of invention to form first and second semiconductor layers in a common semiconductor island as taught by Akbar in the device of Yamazaki et al., Ho et al., Tsutsumi and Koyama to provide memory cells with improved performance and reliability.

Response to Arguments

8. Applicant's arguments filed 1/8/2007 have been fully considered but they are not persuasive. In reference to the rejection based upon 35 U.S.C. 112, the Applicants state:

"when an inert gas is used in sputtering, that one of ordinary skill in the art should know that a specific amount of inert gas should be included in the film being spattered. The inert gas may prevent contamination as stated by the Examiner, however, it should be obvious that the inert gas should be included in the film being sputtered as suggested by Applicants' specification at page 27, lines 10-20 accordingly."

However, the quoted paragraph, in part, states:

"...In this embodiment, a laminate film of a tungsten nitride (WN) film having a thickness of 50 nm and a tungsten (W) film having a thickness of 350 nm is formed by sputtering. When an inert gas of Xenon (Xe), Neon (Ne) or the like is added as a sputtering gas, film peeling due to stress can be prevented."

Clearly, the inert gas is added only to the sputtering gas. There is no indication in the Specification that this gas is expected to be part of the laminate film. It is incorrect to characterize the expectations of one of ordinary skill in the art that "the inert gas should be included in the film being sputtered' when just the opposite is what is expected and desired. Most texts on sputtering (e.g. Wolf et al. 1986) describe the main criteria for selecting a sputter gas is the gas to be non-interactive with the growing film. Any material other than that desired for the deposited film is considered a contamination to be eliminated. If the Applicants wanted the laminate film to comprise the inert gas, this limitation should have been explicitly stated in the Specification "to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention."

In response to applicant's argument that Tsutsumi is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, the Tsutsumi invention is concerned, in part, with gates of MISFETs of which the memory transistors, as described in Yamazaki et al., are a well known examples to one of ordinary skill in the art.

In reference to the composite layer comprising TaN and W giving unexpected results as a gate electrode, the Specification does not explicitly state that the Applicants had known this at the time the application was filed and, therefore, had possession of the claimed invention.

In reference to Ho et al. not showing the metal composite, Ho et al. explicitly state that other refectory metals may be used (Column 2 Lines 52 to 59). In view of these

reasons and those set forth in the present office action, the rejections of the stated claims stand.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(571) 273-8300**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Howard Weiss at **(571) 272-1720** and between the hours of 7:00 AM to 3:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via **Howard.Weiss@uspto.gov**. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on **(571) 272-1705**.

12. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866-217-9197** (toll-free).

13. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/326, 347; 365/ 185.05	thru 6/11/2007
Other Documentation: none	
Electronic Database(s): EAST, IEL	thru 6/11/2007

HW/hw
11 June 2007

Howard Weiss
Primary Examiner
Art Unit 2814